Preview of First Results from Hi-C 2.1 and IRIS

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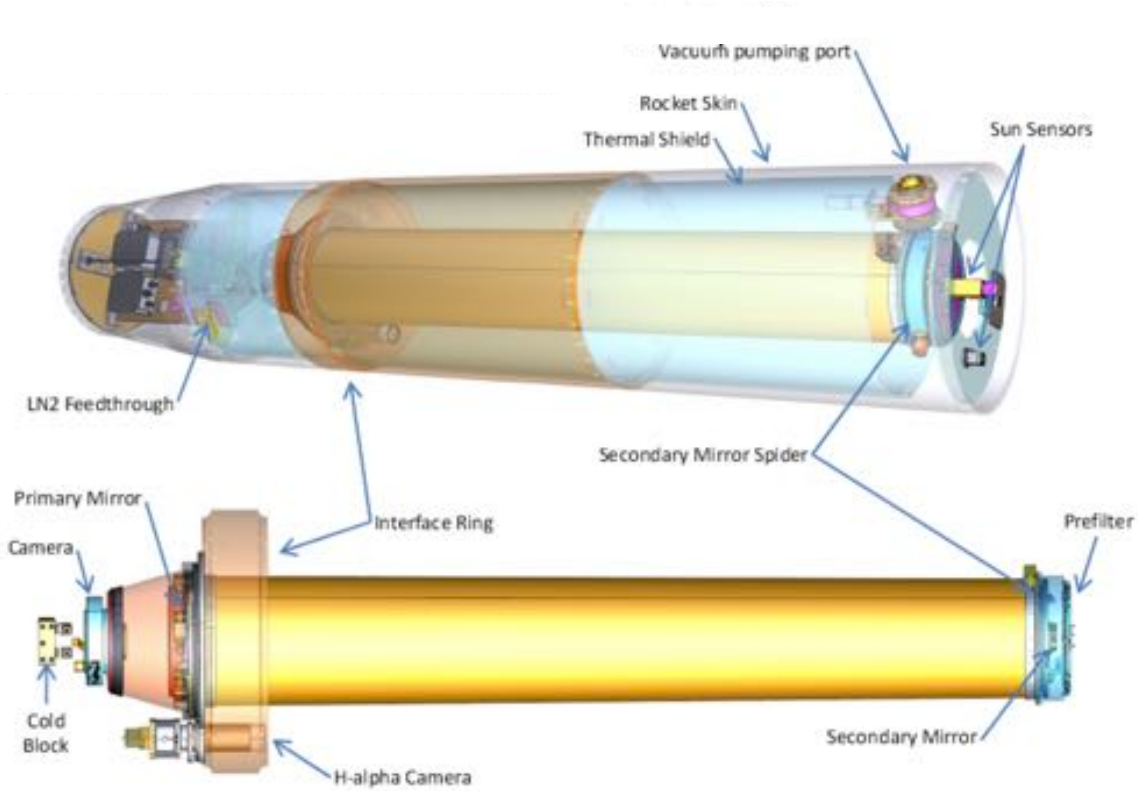
Hi-C: High-resolution Coronal imager

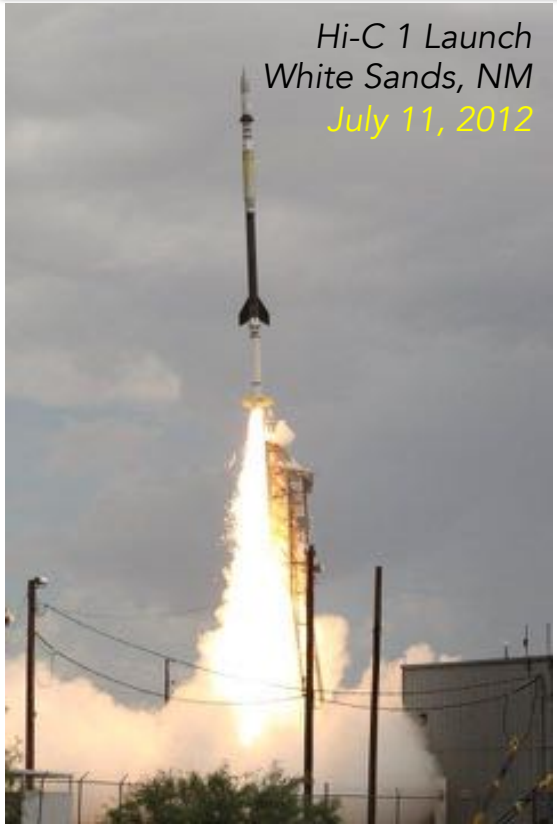
Telescope design capable of ~0.2-0.3” spatial resolution imaging of the corona.

Pointing stability necessary to achieve resolution goal.

Image readout duration and data storage system capable of maintaining high-cadence observations.



Hi-C **1** results

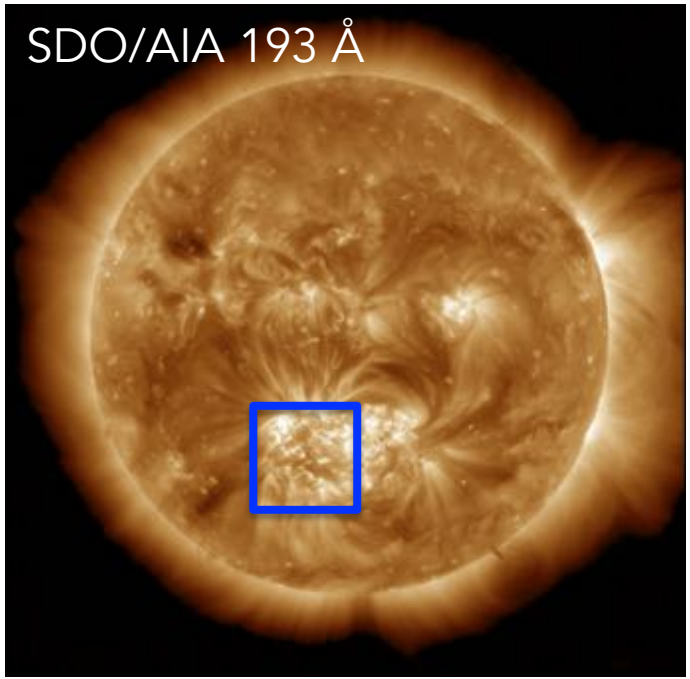


Active Region 11520 – **193 Å**

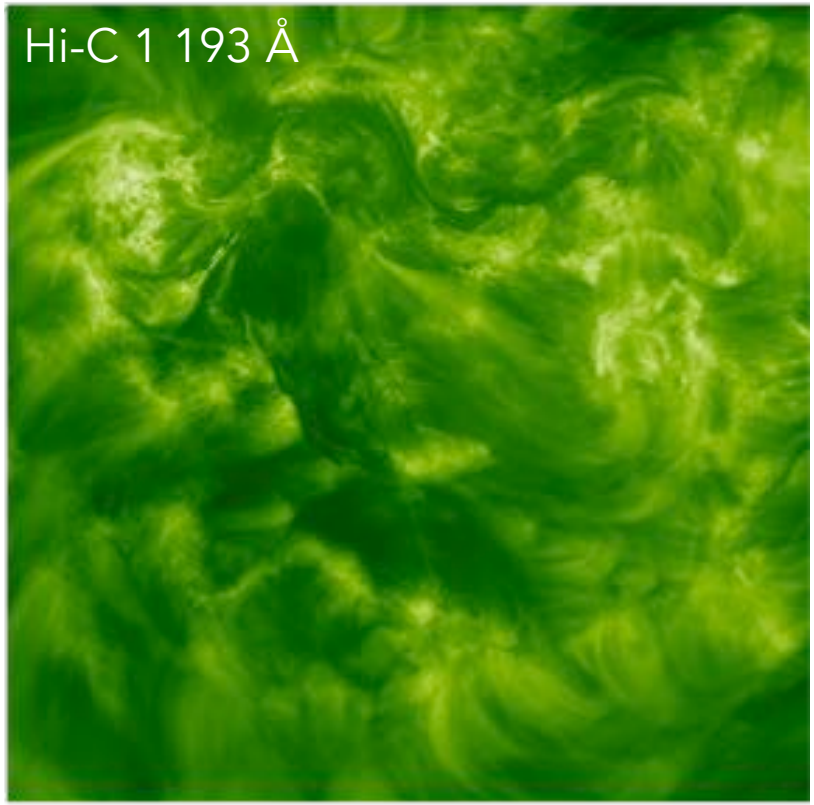
26 publications for 5 minutes of data!

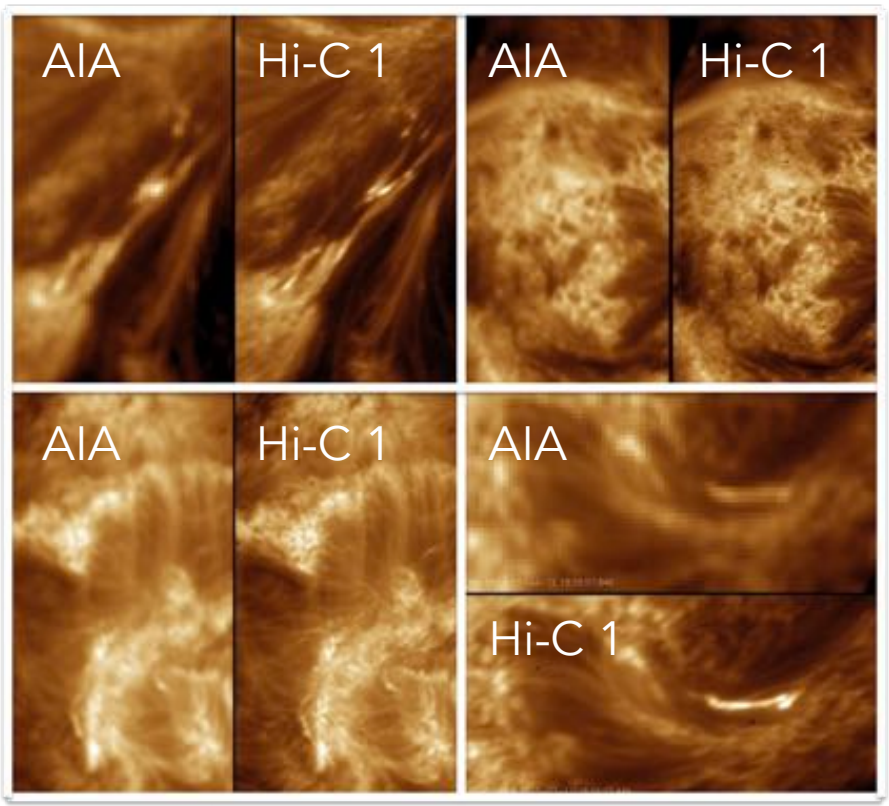
Science highlights:

- Braided loops triggering energy release through magnetic reconnection (*Cirtain et al. 2013, Nature*)
- Subflare triggers
- Nanoflare heating
- Loop sub-structure
- Moss dynamics
- Penumbral jets
- Flows along filament threads
- MHD waves

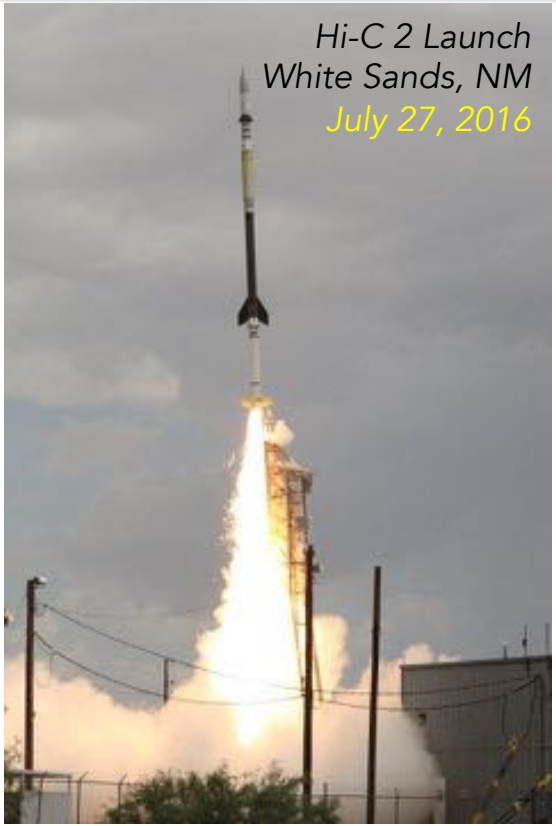


Hi-C 1 results





Hi-C **2**



Hi-C 2 Launch
White Sands, NM
July 27, 2016

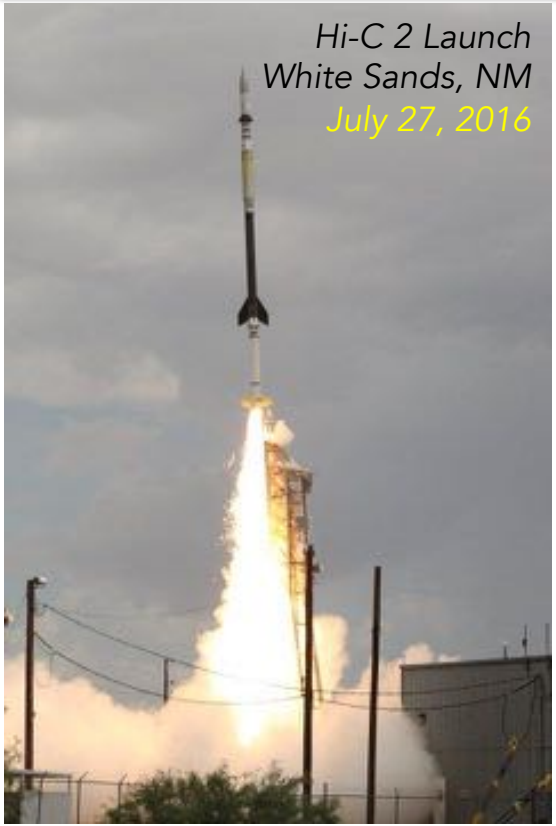
Hi-C 2 mirror recoated to explore the important Chromospheric-Coronal Connection by targeting specific candidates likely to contribute to coronal heating:

1. Type II spicules
2. Hot active region core loops

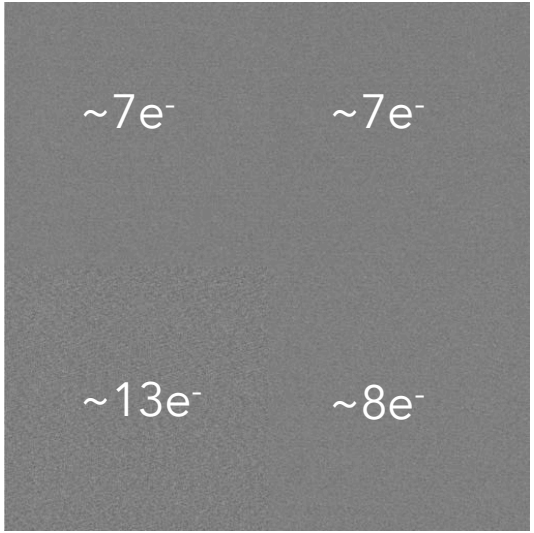
Updates for re-flight:

- Cooler bandpass centered on **172 Å**
- Significant improvement in camera quality (new MSFC-build designed for super low noise)
- **IRIS!**

Hi-C **2** results



Fantastic flight performance verification of the low-noise MSFC-built camera.



Hi-C **2.1**

Cleaned up

Checked alignment

Upgraded cooling system

Added Hall Effect Sensor

Re-proposed

Hi-C **2.1**

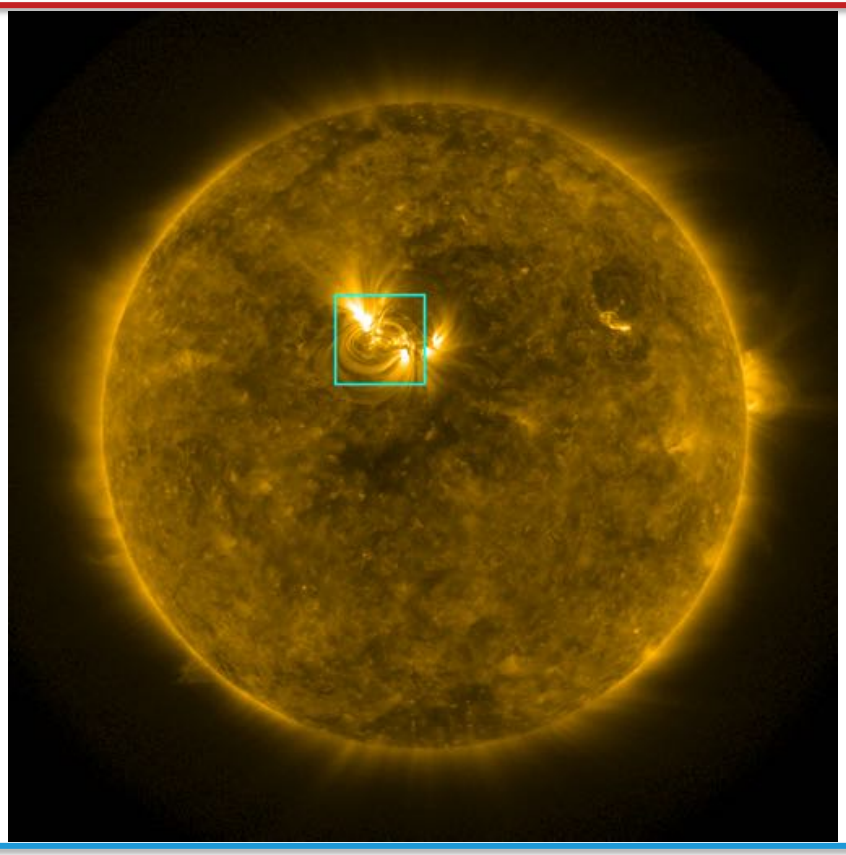
3.5 months after ATP….

Hi-C **2.1**

Hi-C **2.1** Observations

2018 May 29
18:54 UT

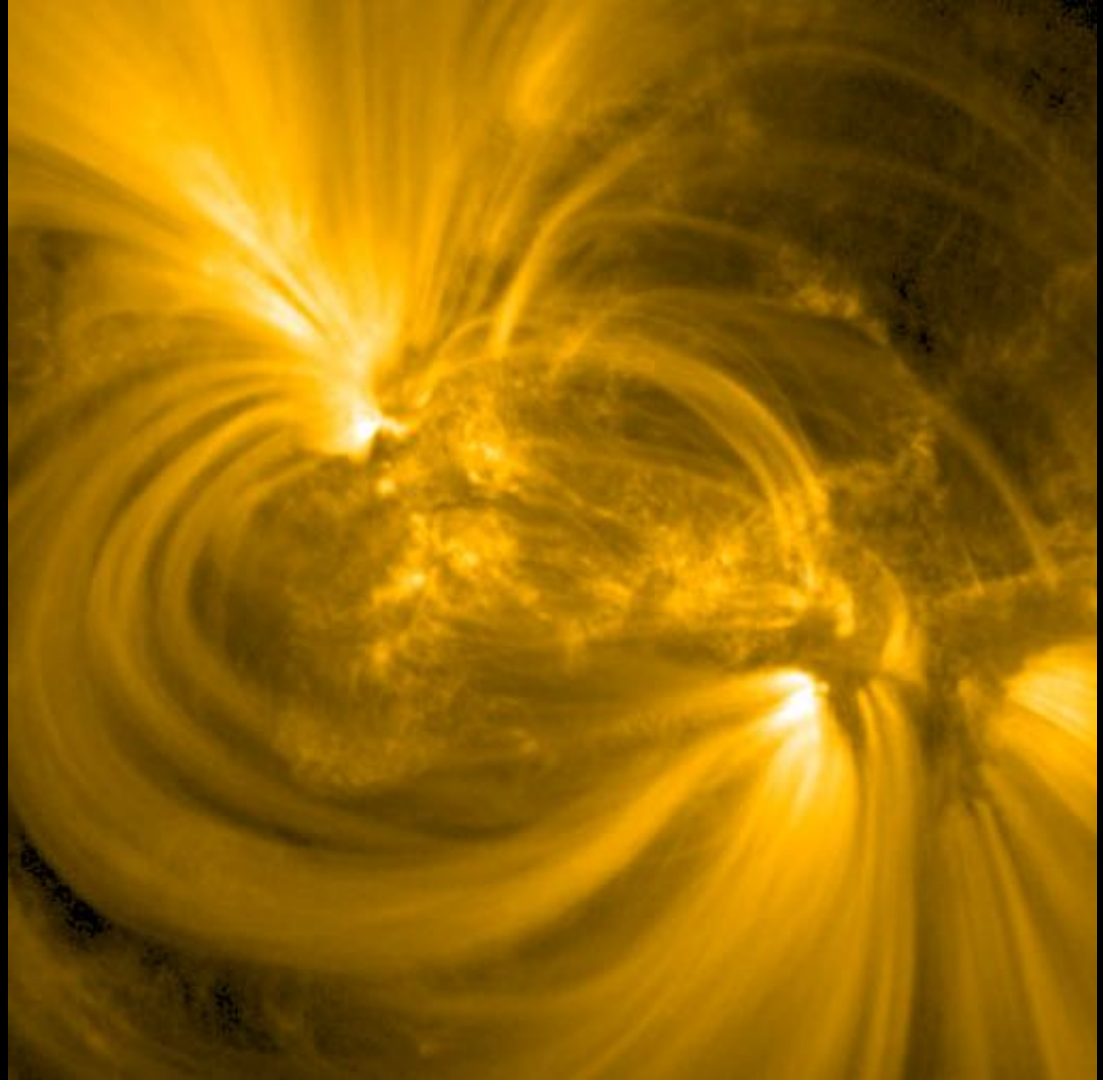
Target: AR 12712



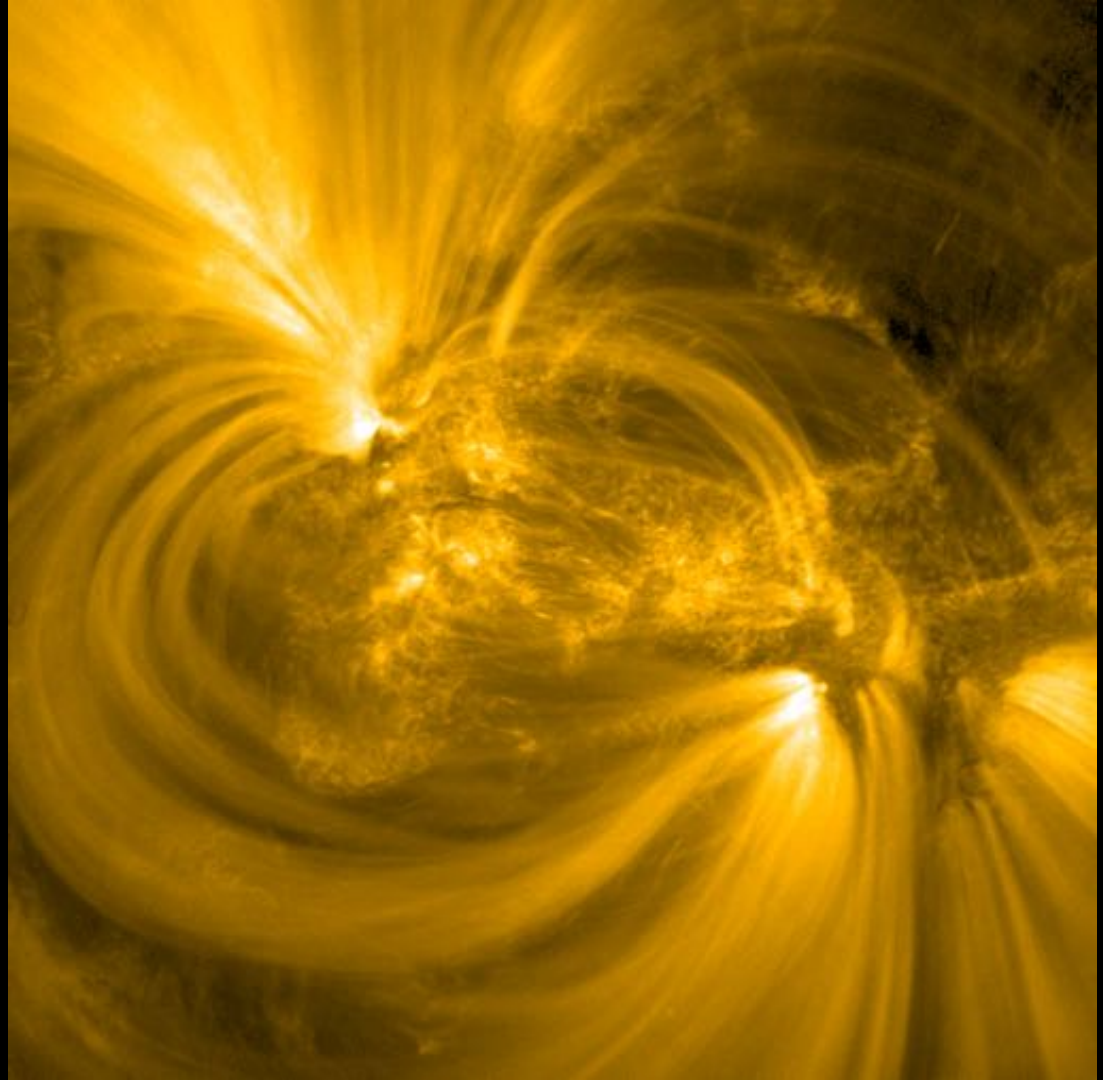
~ 15 minute flight

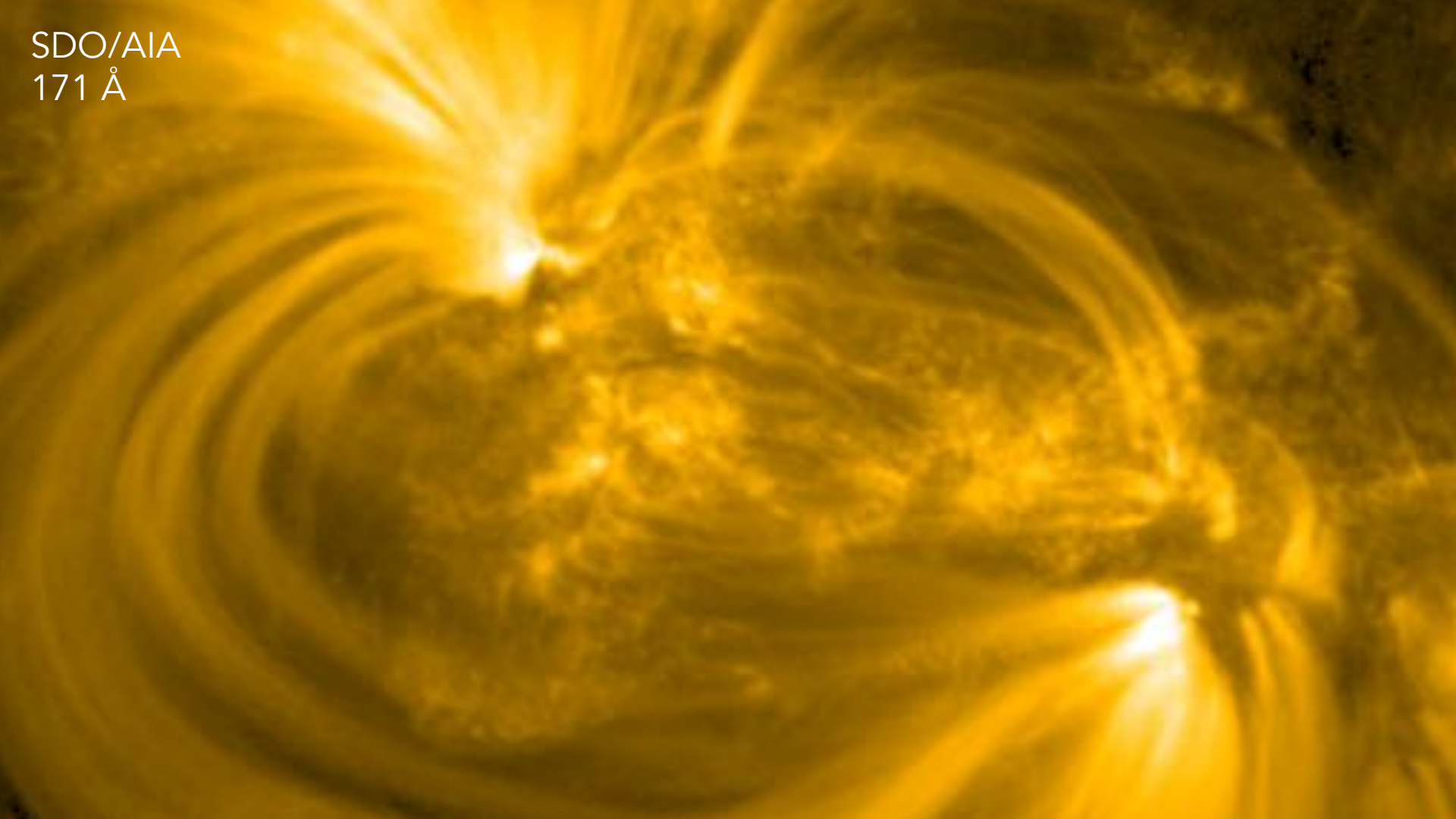
~ 5 minutes of solar viewing data

SDO/AIA
171 Å



Hi-C 2.1
172 Å




SDO/AIA
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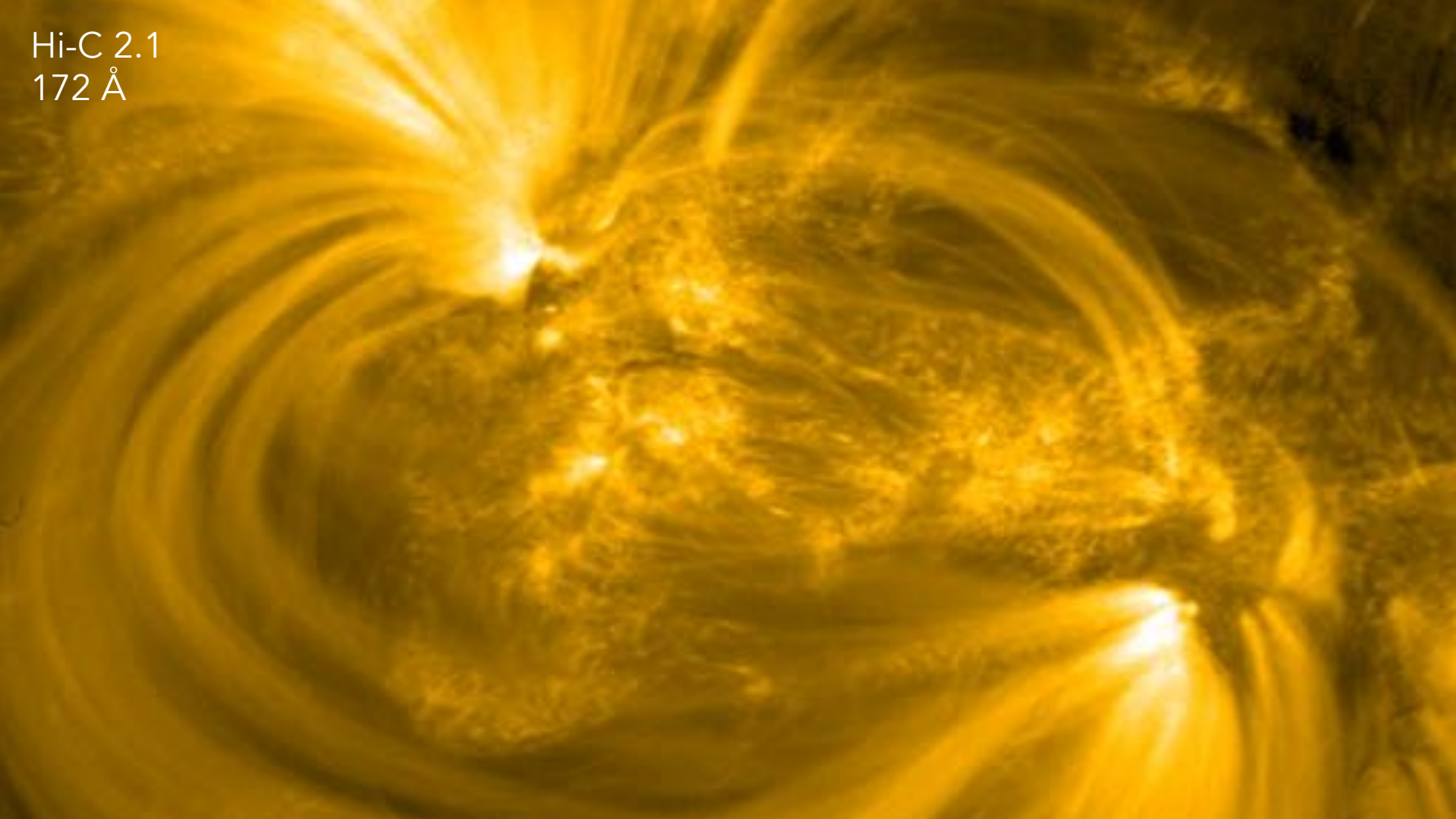
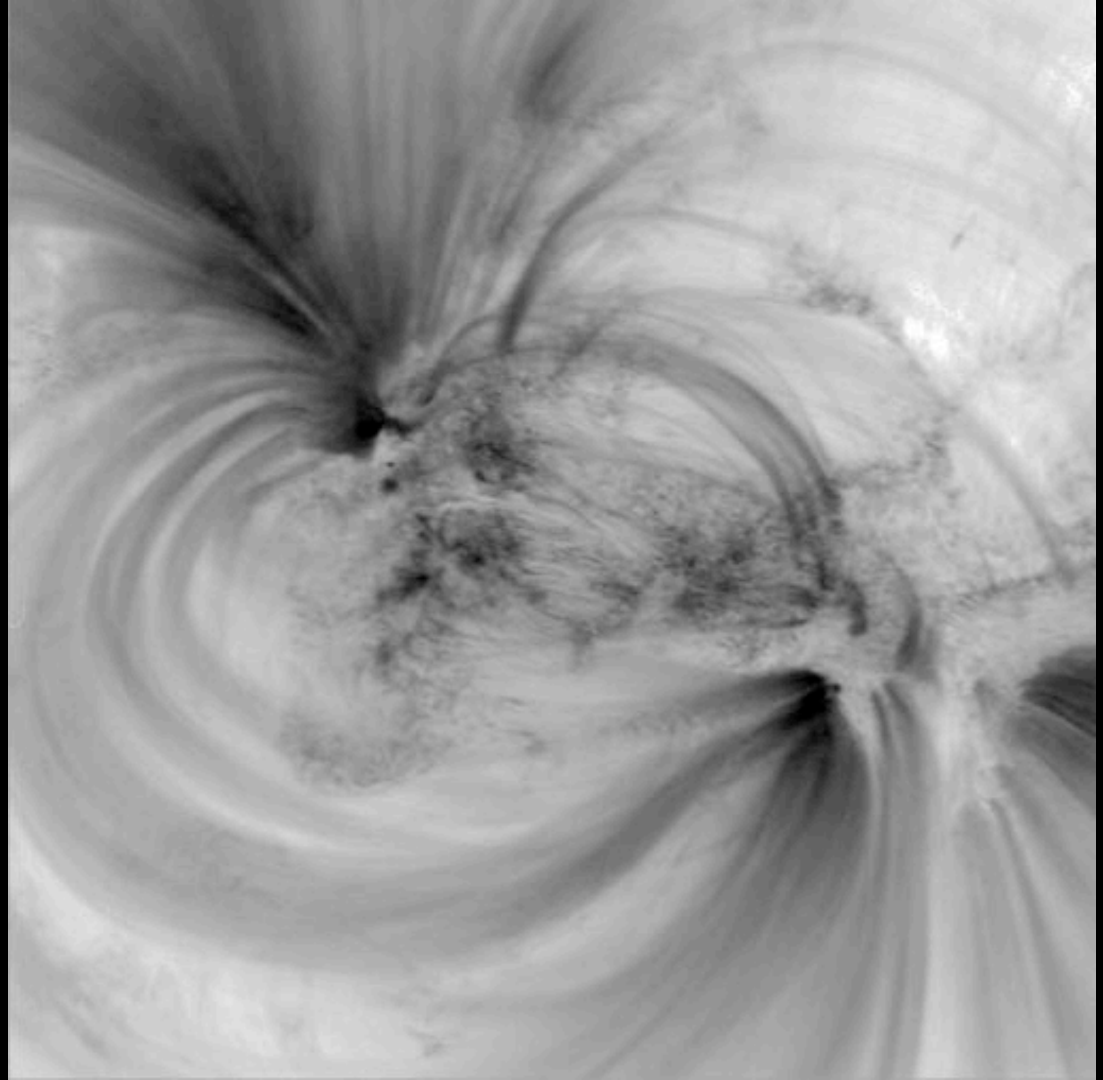
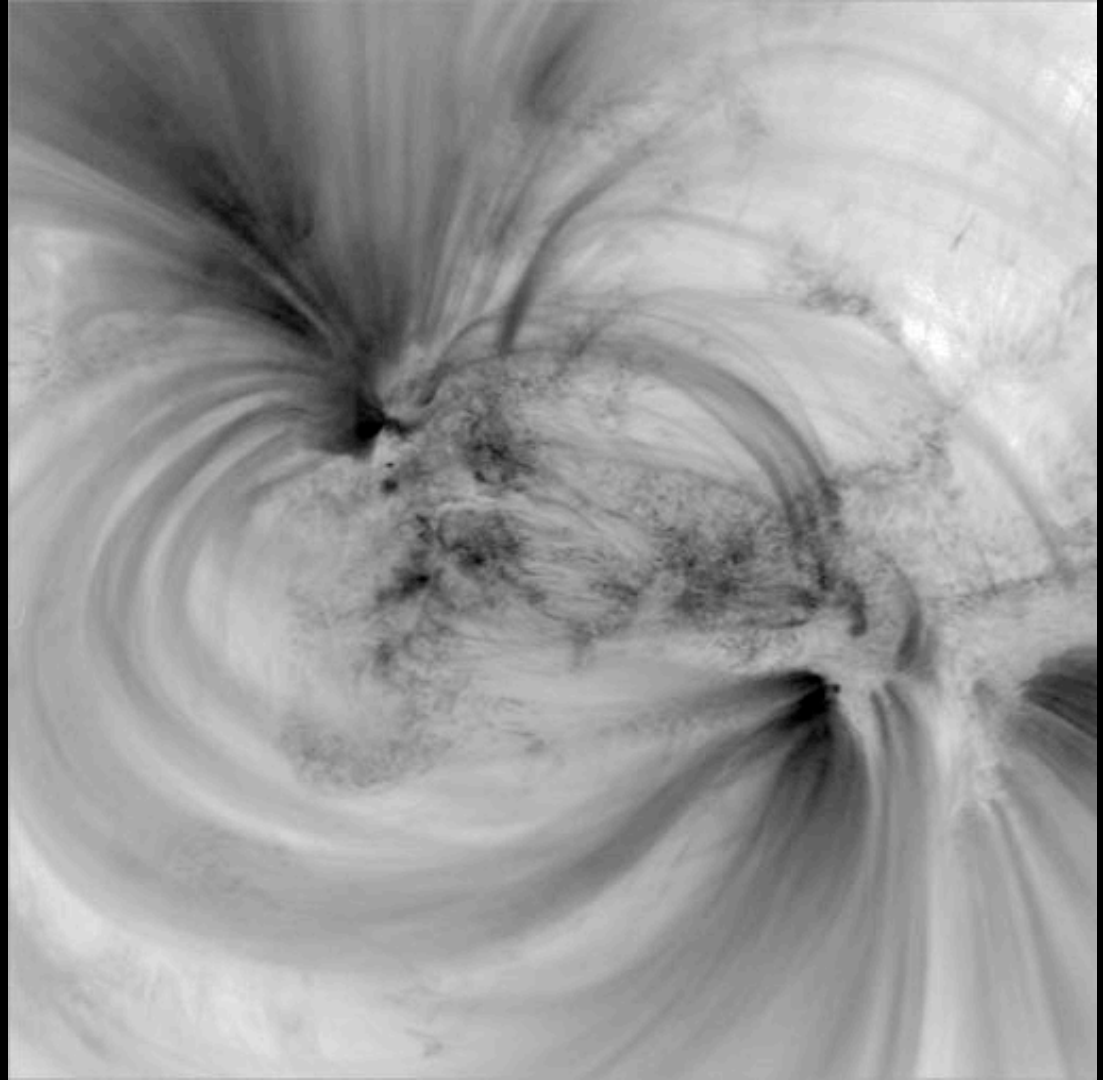
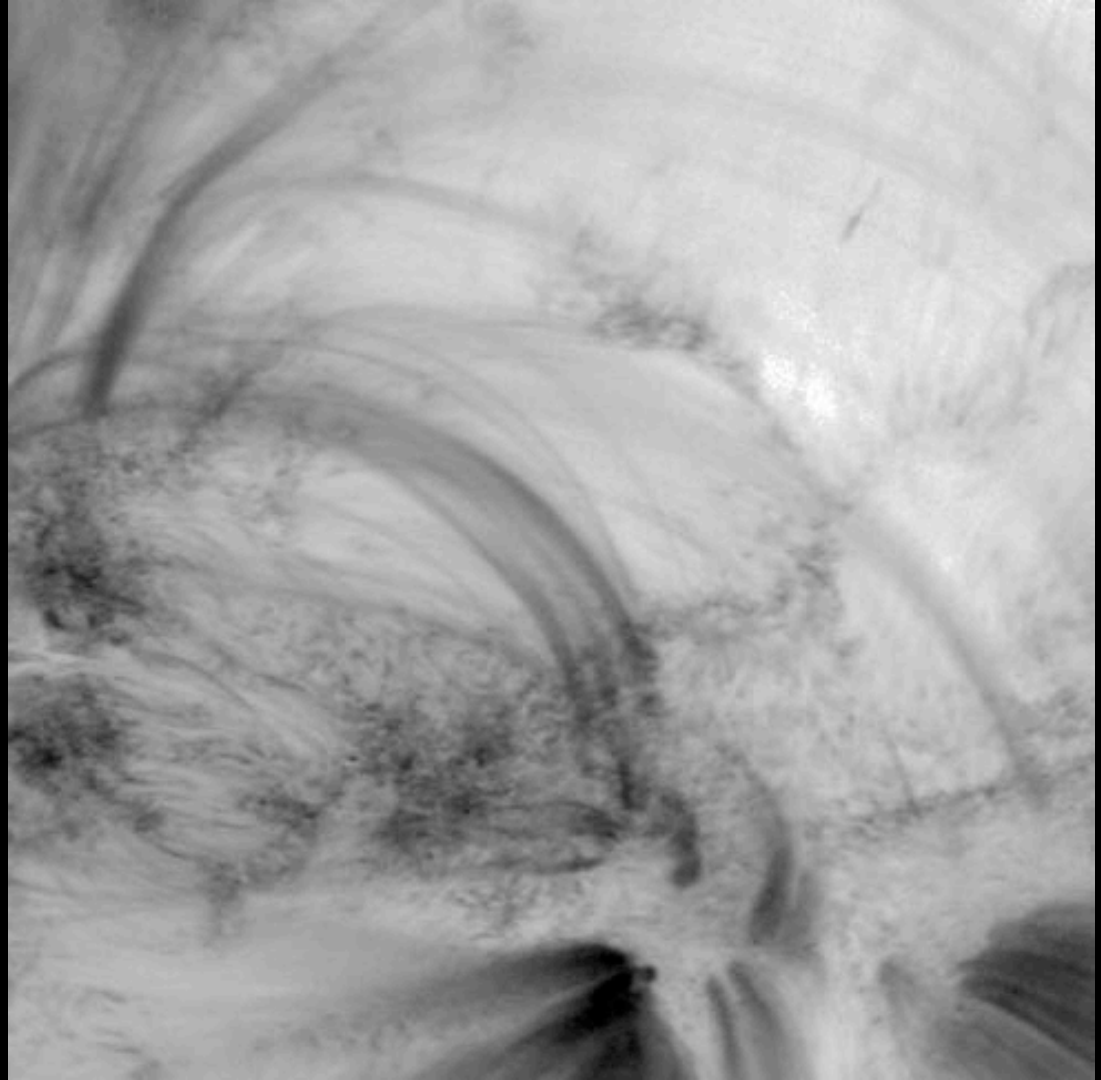

Hi-C 2.1
172 Å







Hi-C **2.1** – What makes this instrument work?

HIGH SPATIAL RESOLUTION

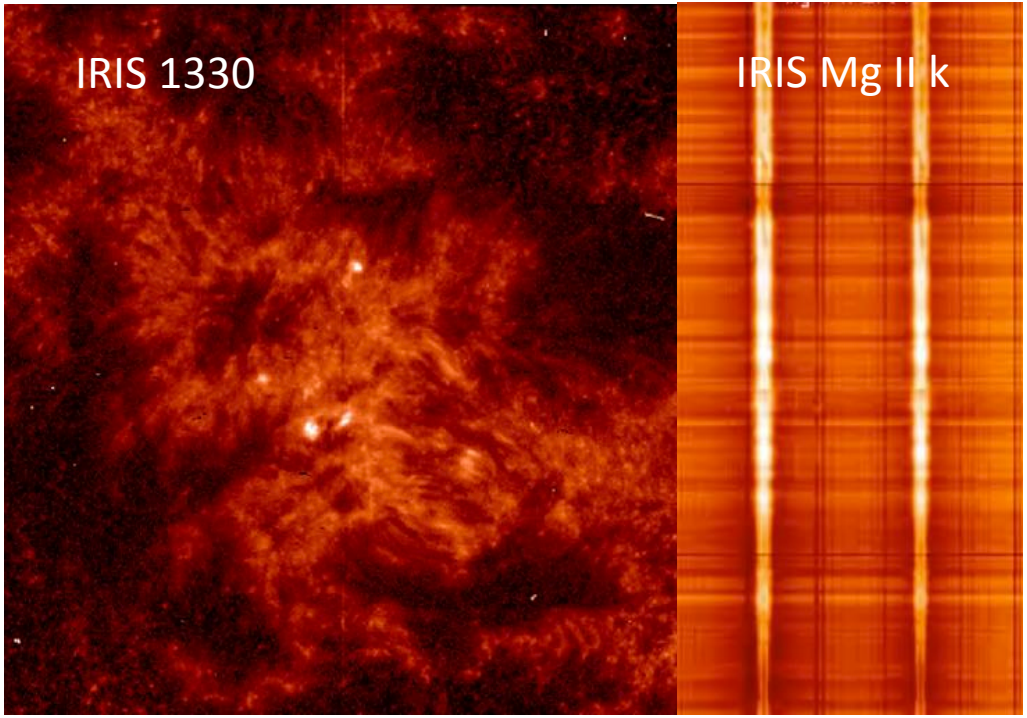
HIGH TEMPORAL RESOLUTION

LOW NOISE CAMERA

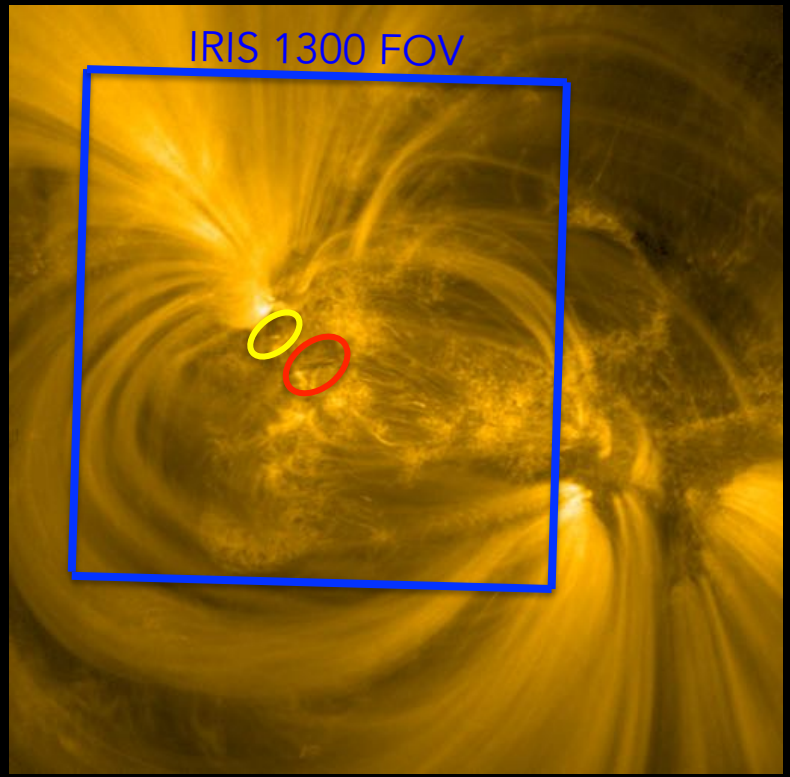
COORDINATED DATA SETS

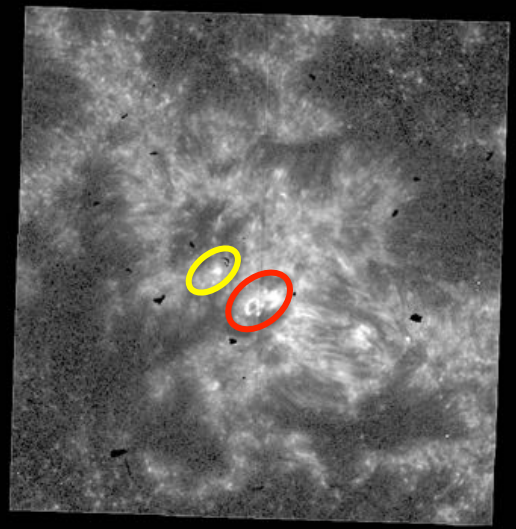
IRIS coordinated data

IRIS observations of a subset of the region at high resolution and spectra will be used to tie small features in the chromosphere to those in the corona.



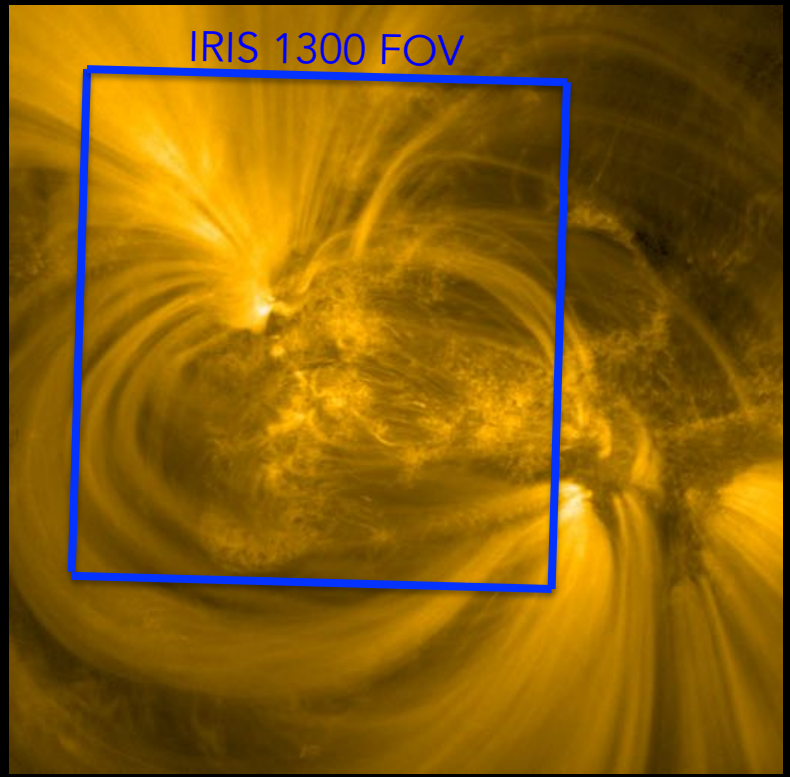
IRIS coordinated data



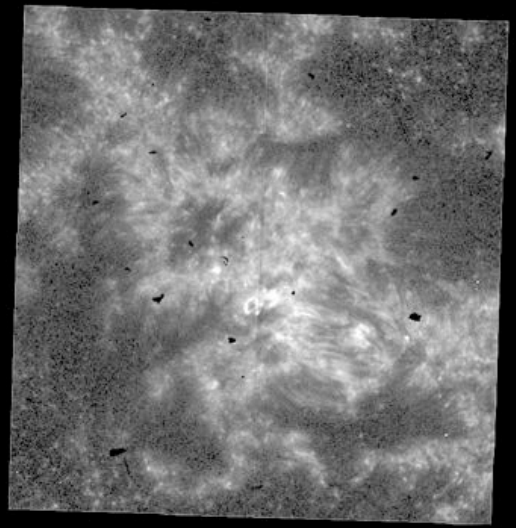


Provided by B. DePontieu

IRIS coordinated data

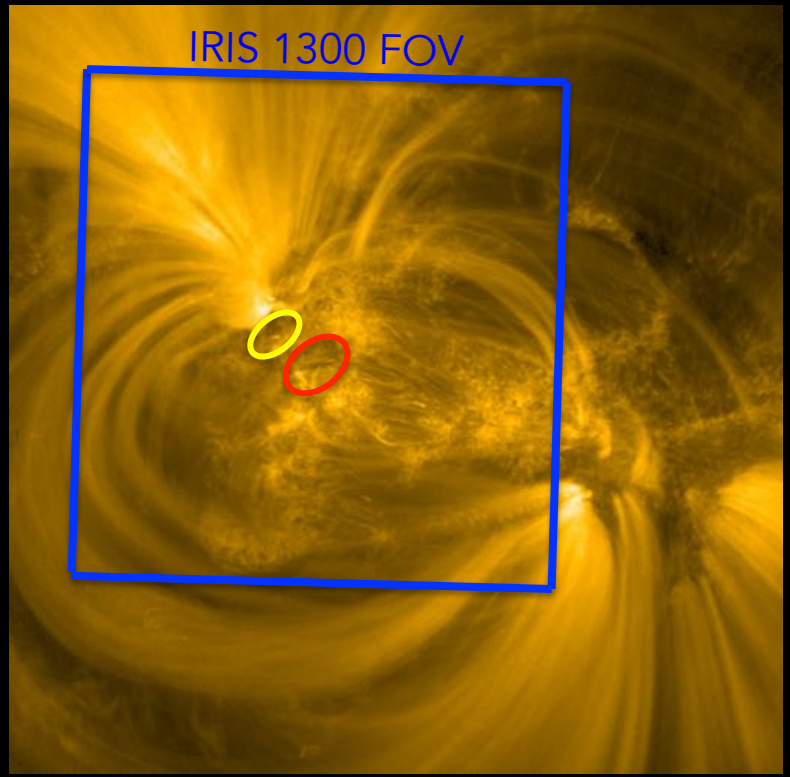


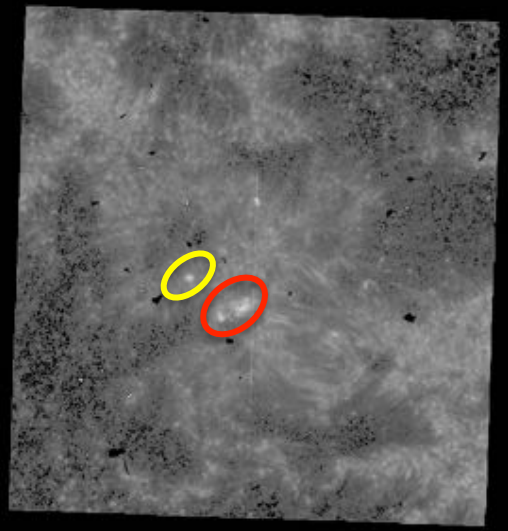
IRIS 1300



Provided by B. DePontieu

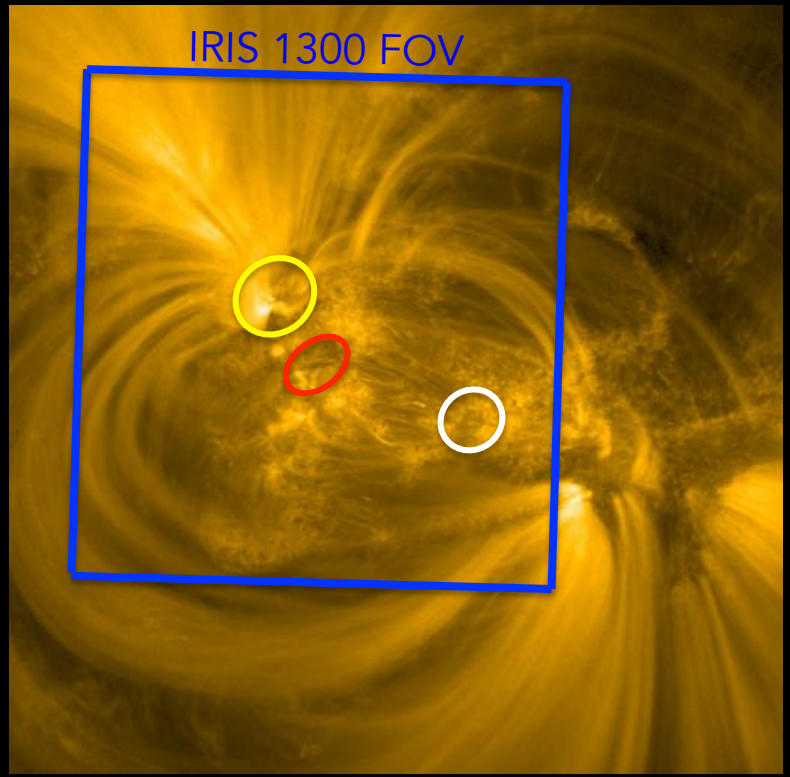
IRIS coordinated data

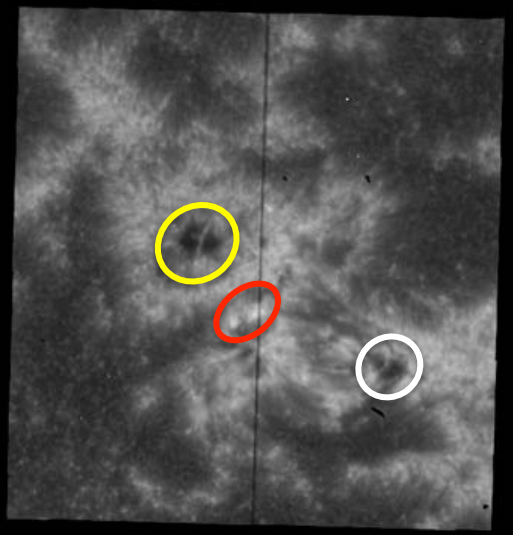




Provided by B. DePontieu

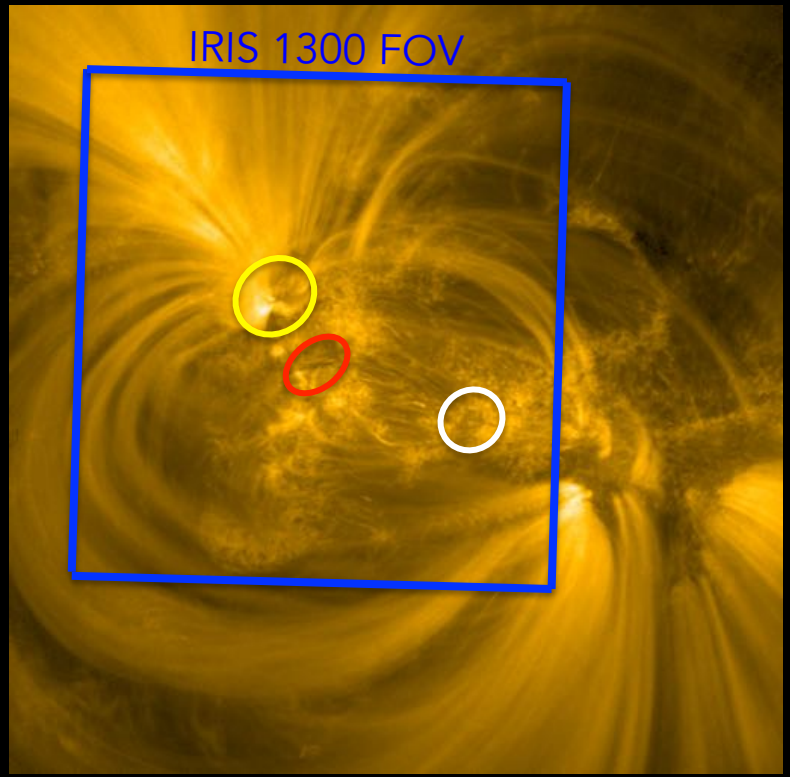
IRIS coordinated data

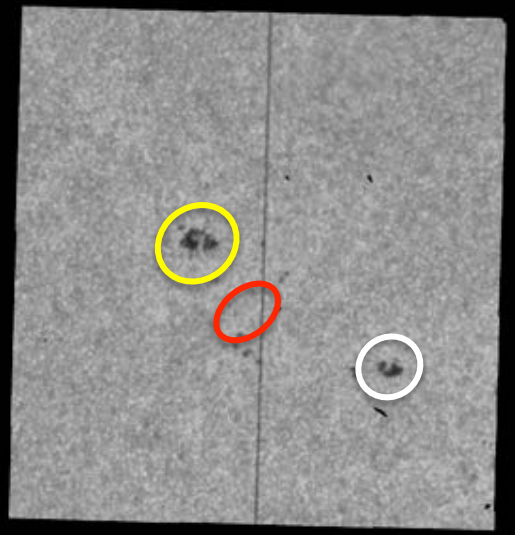




Provided by B. DePontieu

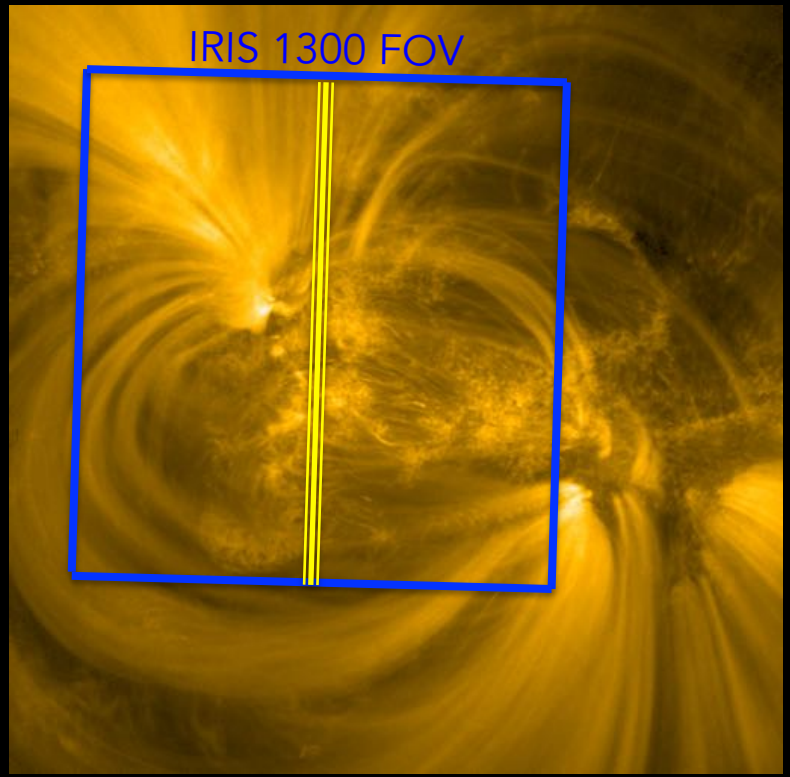
IRIS coordinated data

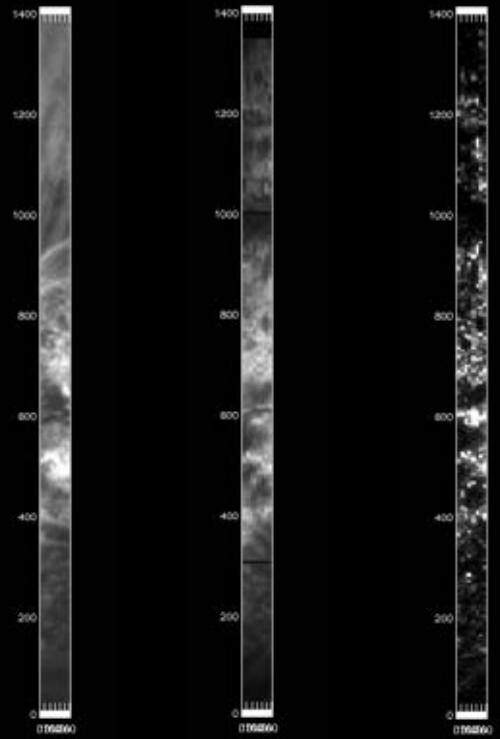




Provided by B. DePontieu

IRIS coordinated data





Provided by B. DePontieu

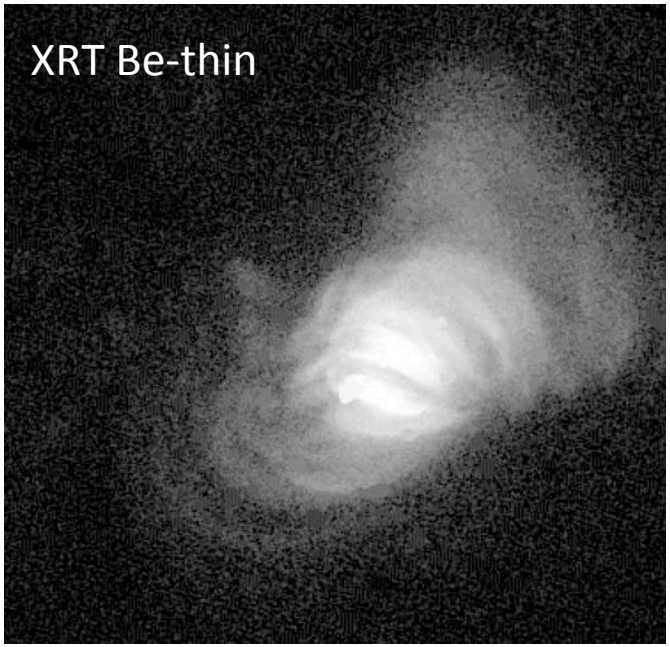
Hinode coordinated data

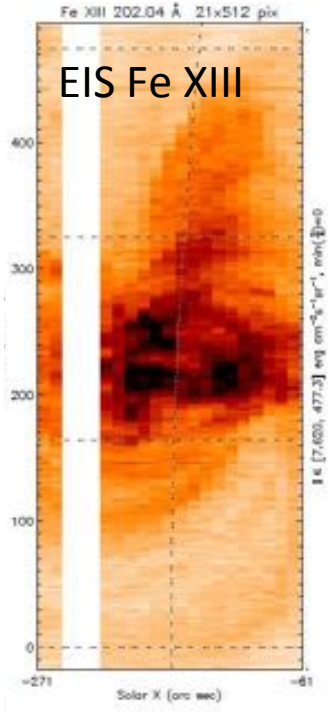
All three Hinode instruments successfully captured the Hi-C 2.1 region.

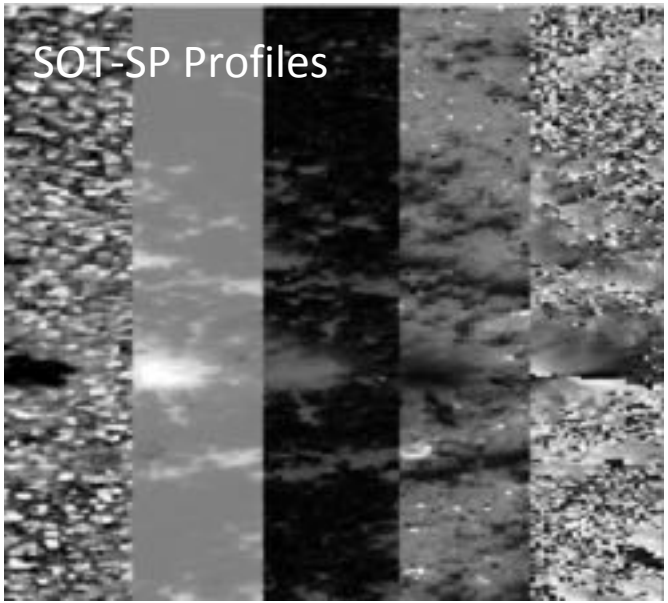
- XRT provides coronal context of the movement of hot plasma in the upper atmosphere above the Hi-C features.
- EIS provides narrowband spectra of the hot coronal loops thereby precisely measuring plasma flow properties.
- SOT-SP provides underlying magnetic field information to high precision.

Hinode coordinated data

All three Hinode instruments successfully captured the Hi-C 2.1 region.



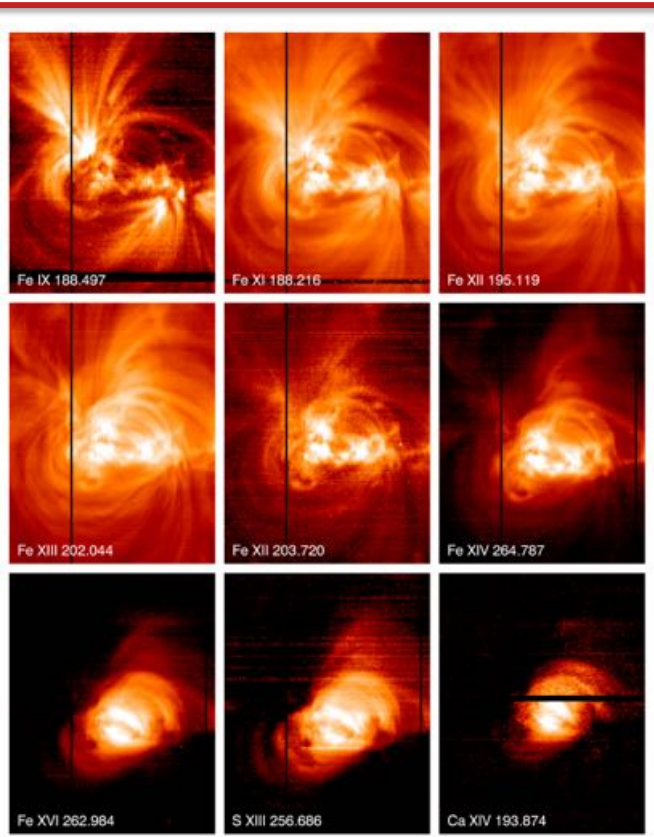


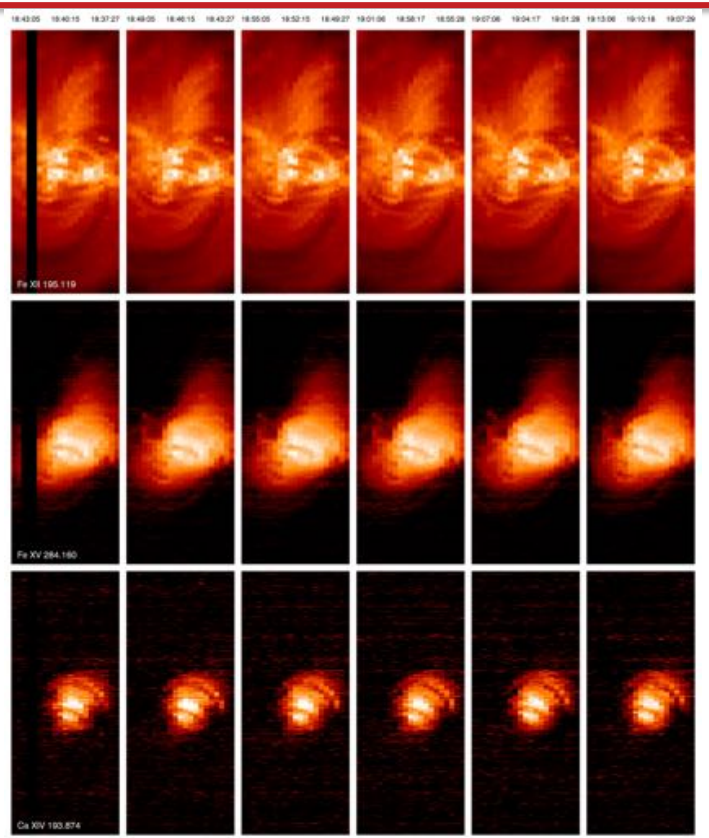


XRT provided by K. Reeves

Hinode coordinated data

EIS is BACK!





Provided by H. Warren & D. Brooks

Science topics being pursued

- Thin, stranded loops [width variations]
- Flows between transition region, chromosphere, and corona
- Spicules
- Nano/microflares
- Moss/Plage brightenings
- Flows along loops
- Waves
- Mini-jets
- Etc.

Additional Coordinated Data Sets

- NuSTAR
- BBSO
- Owens Valley
- ~SST

** Special thanks for assisting with the coordinations goes out to:

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K. Reardon,
B. Chen,
Y. Chai,
N. Karuda,
P. Antolin,
J. Leenaarts,
Gregal Vissers

AGU plug

Add AGU session approved for highlighting sounding rocket results.

Hi-C 2.1 science results expected to be presented in this session!

Abstracts due August 1st….

Thanks, and stay tuned….